

Making solar power more affordable

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by Aditya Mohite

Although the goal of cheap, plentiful energy from the sun turns out to be a work in progress, not a settled achievement, recent research breakthroughs are helping to deliver on the promise of truly “cheap solar,” with several surprising side benefits.

The solar photovoltaic (PV) panels that are becoming more and more common on neighborhood rooftops rely on silicon semiconductors to capture the sun’s rays and, through the photoelectric effect, convert that light into electricity. Silicon has been the semiconductor of choice for PVs for 70 years. The technology is well understood and its 25 percent efficiency in converting sunlight to electricity has been good enough to create market-viable solar panels. But while PVs have come down in price recently, silicon solar cells have bumped up against a hardened cost/energy-efficiency constraint that continues to thwart progress toward a world powered largely by pollution-free solar-generated electricity.

Sensing an opportunity for discovery science to provide a practical solution that could bolster the nation’s energy portfolio, Los Alamos National Laboratory formed the Light to Energy team in 2013. Our goal, which reinforces the energy security component of the Laboratory’s mission, is to develop clean energy by providing low-cost, commercially viable technologies. So this small group turned to an intriguing class of materials called perovskites that could enhance or replace silicon in solar cells.

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